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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,249	10/16/2003	J. Barry Shackleford	200207603-1	4583

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EXAMINER	
NEGIN, RUSSELL SCOTT	
ART UNIT	**PAPER NUMBER**
1631	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/688,249	SHACKLEFORD ET AL.	
	Examiner	Art Unit	
	Russell S. Negin	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7,8,18-20,25 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,8,18-20,25 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of Invention I (claims 1-4, 7-8, 18-20, 25, and 27) in the reply filed on June 13, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

It is acknowledged that the applicant has cancelled claims devoted to non-elected groups and species (claims 5-6, 9-17, 21-24, 26 and 28).

Claims 1-4, 7-8, 18-20, 25, and 27 are examined in this office action.

Specification

The disclosure is objected to because of the following informalities:

On page 9, line 6 states, "...holds a fitness value corresponding each of the n-bit chromosomes..."

On page 15, line 3 states, "Fitness function evaluates different permutations..."

Grammatical corrections are necessary.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-4 and 7-8 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Upon reconsideration of the recent Official Gazette notice of November 22, 2005, entitled, "Interim Guidelines for examination of patent applications for patent subject matter eligibility," (www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm), a 35 U.S.C. 101 rejection is enacted.

In regards to claims 1-4 and 7-8, the instant claims are drawn to an algorithm for determining composition of a compound. An algorithm is non-statutory unless the claims include a step of physical transformation, or if the claims include a useful, tangible and concrete result. It is important to note, that the claims themselves must include a physical transformation step or a useful, tangible and concrete result in order for the claimed invention to be statutory. It is not sufficient that a physical transformation step or a useful, tangible, and concrete result be asserted in the specification for the claims to be statutory. In the instant claims, there is no step of physical transformation, thus the Examiner must determine if the instant claims include a useful, tangible, and concrete result.

In determining if the instant claims are useful, tangible, and concrete, the Examiner must determine each standard individually. For a claim to be "useful," the claim must produce a result that is specific, substantial, and credible. For a claim to be "tangible," the claim must set forth a practical application of the invention that produces a real-world result. For a claim to be "concrete," the process must have a result that can be substantially repeatable or the process must substantially produce the same

result again. Furthermore, the claim must recite a useful, tangible, and concrete result in the claim itself, and the claim must be limited only to statutory embodiments. Thus, if the claim is broader than the statutory embodiments of the claim, the Examiner must reject the claim as non-statutory.

The instant claims do not include any tangible result. A tangible requirement requires that the claim must set forth a practical application of the mathematical algorithm to produce a real-world result. While the claims are directed to a method, system, or computer product of a mathematical algorithm used to make paths between related strings, there is no tangible means of visualizing or displaying the output. Thus the instant claims do not include any tangible result.

In determining if the claimed subject matter produces a useful, concrete, and tangible result, the Examiner must determine each standard individually.. For a claim to be "useful," the claim must produce a result that is specific, and substantial. For a claim to be "concrete," the process must have a result that is reproducible. For a claim to be "tangible," the process must produce a real world result. Furthermore, the claim must be limited only to statutory embodiments.

Claims 1-4 and 7-8 do not produce a tangible result. A tangible result requires that the claim must set forth a practical application to produce a real-world result. This rejection could be overcome by amendment of the claims to recite that a result of the method is outputted to a display or a memory or another computer on a network, or by including a physical transformation.

As stated in the Official Gazette notice, "The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a Sec. 101 judicial exception, in that the process claim must set forth a practical application of that Sec. 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a . . . process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract.""

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4, 7-8, 18-20, 25, and 27 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "monoisotopic" in claims 1, 2, 18, 25, and 27 is used by the claim to mean "single molecular weight of a compound (specifically amino acids)", while the accepted meaning is "an atom having the same number of protons in its nucleus as other varieties of the element but has a different number of neutrons." (definition taken from google.com) The term is indefinite because the specification does not clearly redefine the term. While an element has isotopes, a molecule or compound does NOT have different isotopes according to this definition.

For the purposes of examination, the claims will be analyzed without patentable weight for the word "monoisotopic."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 7-8, 18-20, 25, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by West et al [Journal of Chemical Information and Computer Sciences, 1993, volume 33, pages 234-239].

Claims 1-4, 7-8, 18-20, 25, and 27 state:

1. A method of discovering the elements in a compound with a fitness function, comprising: receiving a set of monoisotopic mass look-up-tables (LUTs) that associates LUT addresses with mass values for a set of elements; identifying mass values in parallel by cross-referencing two or more LUT addresses associated with an electronic chromosome and addresses in the monoisotopic mass LUTs; evaluating different permutations of the identified mass values from the set of monoisotopic mass LUTs; accessing values in two or more mass spectroscopy data sets according to the permutations of mass values identified in the monoisotopic mass LUTs; and determining the combination of elements in the compound according to a correlation between the permutations of mass values and the mass values associated with the mass spectroscopy data set.

2. The method of claim 1 wherein evaluating different permutations further comprises: combining one or more mass values from the set of monoisotopic mass LUTs together; and adding one or more constant values to the combination of one or more mass values.

3. The method of claim 1 wherein the compound is a protein and the elements include one or more amino acids to be discovered during protein sequencing analysis.

4. The method of claim 2 wherein the one or more amino acids are selected from a set of amino acids including: Gly, Ala, Ser, Pro, Val, Thr, Cys, Ile, Leu, Asn, Asp, Gln, Glu, Met, His, Phe, Arg, Tyr, Trp and Lys.

7. The method of claim 1 wherein evaluating different permutations may include one or more of the following: adding or subtracting constants values, summing one or more different mass values.

8. The method of claim 1 wherein the electronic chromosome is a storage area with a series of addresses corresponding to mass values and potentially the elements in the compound.

18. A computer program product for discovering the elements in a compound with a fitness function, tangibly stored on a computer-readable medium, comprising instructions operable to cause a programmable processor to: receive a set of monoisotopic mass look-up-tables (LUTs) that associates LUT addresses with mass

values for a set of elements; identify mass values in parallel by cross-referencing two or more LUT addresses associated with an electronic chromosome and addresses in the monoisotopic mass LUTs; evaluate different permutations of the identified mass values from the set of monoisotopic mass LUTs; access values in two or more mass spectroscopy data sets according to the permutations of mass values identified in the monoisotopic mass LUTs; and determine the combination of elements in the compound according to a correlation between the permutations of mass values and the mass values associated with the mass spectroscopy data set.

19. The computer program product of claim 18 wherein the compound is a protein and the elements include one or more amino acids to be discovered during protein sequencing analysis.

20. The computer program product of claim 18 wherein evaluating different permutations may include one or more of the following: adding or subtracting constants values, summing one or more different mass values.

25. An apparatus for discovering the elements in a compound with a fitness function, comprising: a set of monoisotopic mass look-up-tables (LUTs) that associates LUT addresses with mass values for a set of elements; a set of registers operatively connected to the set of monoisotopic mass LUTs that identifies mass values in parallel by cross-referencing two or more LUT addresses associated with an electronic chromosome and addresses in the monoisotopic mass LUTs; arithmetic logic that evaluates different permutations of the identified mass values from the set of monoisotopic mass LUTs; storage driven by arithmetic logic to access values in two or more mass spectroscopy data sets according to the permutations of mass values identified in the monoisotopic mass LUTs; and arithmetic logic that determines the combination of elements in the compound according to a correlation between the permutations of mass values and the mass values associated with the mass spectroscopy data set.

27. An apparatus for discovering the elements in a compound with a fitness function, comprising: means for receiving a set of monoisotopic mass look-up-tables (LUTs) that associates LUT addresses with mass values for a set of elements; means for identifying mass values in parallel by cross-referencing two or more LUT addresses associated with an electronic chromosome and addresses in the monoisotopic mass LUTs; means for evaluating different permutations of the identified mass values from the set of monoisotopic mass LUTs; means for accessing values in two or more mass spectroscopy data sets according to the permutations of mass values identified in the monoisotopic mass LUTs; and means for determining the combination of elements in the compound according to a correlation between the permutations of mass values and the mass values associated with the mass spectroscopy data set.

The title of West et al, "'SpectraGraph' and 'SpectraSort': Mass Spectral Display and Interpretation Software for the Macintosh," is followed by an abstract which states, "Two computer programs entitled 'SpectraGraph' and 'SpectraSort' have been written for the Apple Macintosh. SpectraGraph allows graphical display, manipulation, storage, and printing of an input mass spectrum list that has been imported from a mass spectrometer or entered manually. SpectraGraph gives the user the ability to display, normalize, and multiply different mass ranges, annotate peaks, and perform various operations on the spectral display. Also the mass spectrum and other graphics may be copied to and from other Macintosh application documents. SpectraSort has been developed to aid in the interpretation of mass spectra, particularly those of biopolymers, by calculating the mass differences between peaks in a mass spectrum. The user then has the option of matching the mass differences with masses of fragments or residues stored in several user-definable look-up tables."

The "look-up tables" for amino acids are illustrated in Figure 8 on page 238 of West et al. This "look-up table" is composed of the list of amino acids claimed in the instant set of claims.

Cross referencing the "look-up tables" with multiple elements forming an electronic chromosome (in this case, an electronic chromosome is interpreted to mean an input sequence of elements) is exemplified in the form of an "Exact mass calculator" as explained in the text on page 238 of West et al. This section of West et al. contains printed sequences which when used electronically with the LUTs executes a calculation.

Figure 6 on page 237 of West et al along with Equation A through F on the first column of page 237 of West et al show how different permutations of masses are evaluated from the LUT of Figure 6. In these permutations, masses are combined from the data associated with multiple elements to result in the analysis of elements in a compound. Masses are subtracted and result in the chemical formula of a molecule or protein.

Figure 1 on page 235 of West et al shows that this analysis system uses computer software and is part of a hardware apparatus as claimed in the instant set of claims.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

An obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but an examined application claim is not patentably distinct from the reference claim(s) because the examined claim is either anticipated by, or would be obvious over, the reference claim(s). see, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985).

Claims 1, 3, 18, 20, 25, and 27 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 10-11, 23-24, and 30 of U.S. Patent No. 6,723,982 B1 ('982). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '982 are a species of the claims of the instant application.

All of the limitations of the instant claims are anticipated by the claims of the reference patent. The reference patent, however, has the additional limitation of "reduced storage requirements" in the preambles of the independent claims. This phrase causes the reference patent claims to be a species of the instant set of claims.

Conclusion

No claim is allowed.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61

(November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, Ph.D., whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Andrew Wang, Supervisory Patent Examiner, can be reached at (571) 272-0811.

Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instrument Examiner, Yolanda Chadwick, whose telephone number is (571) 272-0514.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

-RSN
21 August 2006

21 Aug 2006

21 August 2006

JOHN S. BRUSCA, PH.D
PRIMARY EXAMINER